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Observations of Comet 1884 (Barnard) made at the Royal Observatory, Cape of Good Hope.

(*Communicated by David Gill, LL.D., F.R.S., H.M. Astronomer.*)

The following observations were made with the 7-inch Equatorial and Repsold filar micrometer by Mr. W. H. Finlay, Chief Assistant. The comet was so situated that meridian observations of the comparison stars could always be secured with the transit circle within a few nights after their comparison with the comet. The observations are corrected for the effects of refraction.

The comet throughout presented the appearance of a small diffused nebulous mass. A nucleus was seen by glimpses on July 28, but the bright moonlight on following nights prevented more than an occasional suspicion of its existence. About the end of July the point of greatest condensation (in which the nucleus had been seen) was slightly towards the following part of the mass; this was the point observed. In August the appearance of the comet was reduced by moonlight to a small round mass slightly brighter towards the centre; the centre of this mass was observed. The comet presented a similar appearance in September, and was similarly observed. The comet, as a rule, was faint and difficult to observe in August, probably from its being projected on the Milky Way as a background. An apparent increase of brightness on September 15 and following days was very striking, compared with the appearance of the comet in the end of August.

Observations of Comet Pons-Brooks have been secured on forty-three nights from January 16 to April 29 inclusive, and will be published so soon as the meridian observations of the comparison stars have been completed.

Differences of R.A. and N.P.D. of the Comet and Comparison Stars, observed with the 7-inch Equatorial.

Date.	Cape Mean Time.	Δα ☄ − ✱	No. of Trans.	ΔN.P.D. ☄ − ✱	No. of Bisecs.	Comparison ✱
	h m s	m s		′ ″		
July 24	10 8 8·1	−0 13·0	4	+6 57·1	4	*a*
26	10 38 4·0	+4 30·38	4	−6 29·0	4	*b*
27	10 54 54·1	+0 10·09	16	−1 14·3	16	*c*
28	11 6 15·8	−0 14·11	16	+6 33·3	16	Stone 8897.
29	11 10 32·2	+1 0·99	16	−2 26·8	16	Stone 8913.
30	11 5 15·7	+0 47·41	16	+1 59·5	16	*d*
Aug. 1	10 19 53·3	−0 7·04	10	+1 31·0	6	*e*
5	9 35 49·5	+0 32·05	16	+0 53·5	16	*f*
6	9 53 49·7	+0 30·12	16	+2 18·8	16	*g*
7	10 10 18·4	+0 21·60	16	+1 31·6	16	*h*
8	10 10 5·0	−0 20·07	20	−0 46·7	16	*i*

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Date.	Cape Mean Time.	Δα ☄ − ✱	No. of Trans.	Δ N.P.D. ☄ − ✱	No. of Bisecs.	Comparison ✱
	h m s	m s		′ ″		
Aug. 11	10 4 50·4	−0 22·80	20	−1 2·6	16	*k*
13	10 14 35·2	+0 23·13	20	−3 30·7	16	*l*
14	9 45 9·5	−0 21·98	12	−3 17·2	12	*m*
17	9 47 36·8	+0 29·46	16	+0 0·8	16	*n*
19	10 10 4·8	−0 17·79	15	−2 37·2	16	*o*
20	10 2 33·1			−0 9·5	8	*p*
20	10 12 46·7	−0 25·26	16			*p*
22	10 26 1·8	+0 10·08	16	+4 52·3	16	*q*
23	10 4 39·6	+0 35·86	16	+5 4·2	16	Yarnall 7433.
Sept. 15	10 19 31·8	+0 11·50	24	+5 7·9	18	O. Arg. S. 19534.
17	10 27 13·5	−0 51·09	16	+2 12·9	16	O. Arg. S. 19737.
21	9 44 44·1	−0 16·20	17	−2 26·6	12	Stone 10673.
22	10 12 12·9	+0 54·93	12	+0 7·3	16	O. Arg. S. 20039.

Notes.

July 24. Comet exceedingly faint and difficult; hazy.
28. Comet much easier to-night; distinct appearance of nucleus or condensation.
Aug. 1. Comet very faint: bright moonlight.
5. Moon very bright; but fair observations.
7. Bright moonlight; air very damp and hazy; comet very faint.
13. Comet faint.
19. Comet very faint; very difficult.
20. Comet exceedingly faint, scarcely possible to observe at all.
22. Fair observations.
Sept. 15. Comet much easier, and brighter than when last observed.

The following Table gives the differences of Right Ascension and N.P.D. between the comparison stars and brighter stars observed with the Equatorial.

Star.	Mag.	R.A. = ✱	N.P.D. = ✱	Compared with ✱.
		m s	′ ″	
a	9½	+2 5·10	−1 30·8	*a′*
b	9	−4 22·0	−5 49·5	*b′*
c	10	−2 57·55	+7 51·9	Stone 8897.
c	10	−4 19·75	−0 52·0	Stone 8913.
d	7½	+2 55·0	−4 54·6	Stone 8913.
e	10	+0 13·10	+3 43·1	*e′*
f	10	+2 32 85	−0 45·7	Stone 9061.
h	9½	+3 28·30	−1 55·0	*g*
h	9½	−4 2·95	+0 35 5	*i*
k	10	+0 15·12	−7 10·2	*k′*
k′	8½	+0 3·10	−7 40·7	Stone 9295.
o	10½	−0 26·90	−2 33·5	*o′*

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Adopted Right Ascensions and North Polar distances of Stars observed with the Comet.

Star.	Mag.	Mean R.A. 1884·0.	Mean N.P.D. 1884·0.	Date of Comp. with ☌	Reductions to App. Place. R.A.	Reductions to App. Place. N.P.D.	Authority for Mean Place.
		h m s	° ′ ″		s	″	
a	9½	16 5 39·80	127 7 47·3	July 24	+3·83	+ 5·7	Measures with Equatorial.
a′	8½	16 3 34·70	127 9 18·1	24	+3·83	+ 5·7	3 Meridian observations Cape 1884
b	9	16 5 40·52	127 21 57·9	26	+3·85	+ 5·2	Measures with Equatorial.
b′	7½	16 10 2·52	127 27 47·4	26	+3·85	+ 5·2	3 Meridian observations.
c	10	16 12 27·70	127 16 44·8	27	+3·84	+ 5·0	Measures with Equatorial.
Stone 8897	7	16 15 24·88	127 8 52·4	27, 28	+3·84	+ 4·7	Stone 8897.
Stone 8913	6	16 16 47·64	127 17 37·2	27, 29	+3·82	+ 4·7	Stone 8913.
d	7½	16 19 42·64	127 12 42·6	30	+3·82	+ 4·7	Measures with Equatorial.
e	10	16 26 8·91	127 11 44·7	Aug. 1	+3·84	+ 3·8	,, ,,
e′	8	16 25 55·81	127 8 1·6	1	+3·84	+ 3·8	2 Meridian observations.
Stone 9061	7	16 34 59·59	127 6 55·4	5	+3·83	+ 3·0	Stone 9061.
f	10	16 37 32·44	127 6 9·7	5	+3·83	+ 3·0	Measures with Equatorial.
g	7½	16 40 50·42	127 2 23·1	6	+3·84	+ 2·5	2 Meridian observations.
h	9½	16 44 18·34	127 0 29·3	7	+3·84	+ 2·1	Measures with Equatorial.
i	7½	16 48 20·93	126 59 54·7	8	+3·85	+ 1·8	3 Meridian observations.

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Star.	Mag.	Mean R.A. 1884·0.	Mean N.P.D. 1884·0.	Date of Comp. with ☌	Reductions to App. Place. R.A.	Reductions to App. Place. N.P.D.	Authority for Mean Place.
		h m s	° ′ ″		s	″	
Stone 9295	6½	16 58 30·01	127 3 58·2	Aug. 11	+3·86	+ 0·9	Stone 9295.
k′	8½	16 58 33·17	126 56 17·1	11	+3·86	+ 0·9	2 Meridian observations.
k	10	16 58 48·29	126 49 6·9	11	+3·86	+ 0·9	Measures with Equatorial.
l	9½	17 5 18·69	126 42 15·1	13	+3·85	+ 0·2	2 Meridian observations.
m	9	17 9 41·92	126 36 43·1	14	+3·85	− 0·2	3 „
n	9½	17 20 14·28	126 14 55·0	17	+3·84	− 1·2	2 „
o	10½	17 28 54·91	126 2 44·1	19	+3·84	− 2·1	Measures with Equatorial.
o′	8½	17 29 21·81	126 5 17·6	19	+3·84	− 2·1	2 Meridian observations.
p	9	17 33 1·39	125 52 26·2	20	+3·83	− 2·4	2 „
q	8	17 40 30·55	125 29 35·7	22	+3·82	− 3·2	2 „
Yarnall 7433	8½	17 44 5·16	125 19 53·4	23	+3·81	− 3·5	Cape and Washington.
O. Arg. S. 19534	8½	19 19 48·86	119 32 10·0	Sept. 15	+3·59	−12·2	O. Arg. and 2 Cape Merid. observs.
„ 19737*	8½	19 28 48·23	118 55 17·6	17	+3·57	−13·0	2 Meridian observations.
„ 19997	8½	19 43 37·70	117 38 28·8	21	+3·52	−14·2	Stone 10673.
„ 20039	7½	19 46 17·93	117 14 26·5	23	+3·50	−14·4	O. Arg., Wash., 8540 & Cape Mer.

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Resulting Places of the Comet.

Date.	Cape M.T.	R.A.	Log. par. factor.	N.P.D.	Log. par factor.
	h m s	h m s		° ′ ″	
July 24	10 8 8·1	16 5 30·56	8·6170	127 14 49·1	8·5798
26	10 38 4·0	16 10 14·75	8·6675	127 15 34·1	8·8389
27	10 54 54·1	16 12 41·63	8·7033	127 15 35·5	8·9868
28	11 6 15·8	16 15 14·61	8·7251	127 15 30·4	9·0719
29	11 10 32·2	16 17 52·45	8·7340	127 15 15·1	9·1072
30	11 5 15·7	16 20 33·87	8·7267	127 14 46·8	9·0792
Aug. 1	10 19 53·3	16 26 5·69	8·6435	127 13 19·6	8·5911
5	9 35 49·5	16 38 8·32	8·5302	127 7 6·2	7·6990
6	9 53 49·7	16 41 24·38	8·5798	127 4 44·4	8·4472
7	10 10 18·4	16 44 43·78	8·6325	127 2 3·0	8·7076
8	10 10 5·0	16 48 4·67	8·6325	126 59 9·8	8·7076
11	10 4 50·4	16 58 29·35	8·6222	126 48 5·2	8·6902
13	10 14 35·2	17 5 45·67	8·6464	126 38 44·6	8·8195
14	9 45 9·5	17 9 23·79	8·5798	126 33 25·7	8·5315
17	9 47 36·8	17 20 47·58	8·5763	126 14 54·6	8·5798
19	10 10 4·8	17 28 40·96	8·6345	126 0 4·9	8·8325
20	10 12 46·7	17 32 39·96	8·6395	125 52 10·9	8·7709
22	10 26 1·8	17 40 44·45	8·6665	125 34 24·9	9·0000
23	10 4 39·6	17 44 44·83	8·6170	125 24 54·1	8·8513
Sept. 15	10 19 31·8	19 20 3·95	8·6138	119 37 5·7	9·2355
17	10 27 13·5	19 28 0·71	8·6263	118 57 17·5	9·2718
21	9 44 44·1	19 43 25·02	8·5132	117 35 48·0	9·2253
22	10 12 12·9	19 47 16·36	8·5866	117 14 19·4	9·2945

The comet was also observed with the transit-circle by Mr. Finlay on August 14 and 16, with the following results:—

Aug. 14	7 34 48·8	17 9 6·19		126 33 57·5	8·6812
16	7 34 26·0	17 16 36·39		126 22 6·6	8·6435

The Orbit of Barnard's Comet, 1884. By J. Morrison, M.D., Ph.D., Assistant on the American Ephemeris, Washington, D.C.

From the numerous observations of this comet, already published, I select for the purpose of computing elliptic elements the following observations made at Cambridge, Mass., Nice, and Washington respectively:—